



Climate change, ambient ozone, and health in 50 US cities

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Abstract:

We investigated how climate change could affect ambient ozone concentrations and the subsequent human health impacts. Hourly concentrations were estimated for 50 eastern US cities for five representative summers each in the 1990s and 2050s, reflecting current and projected future climates, respectively. Estimates of future concentrations were based on the IPCC A2 scenario using global climate, regional climate, and regional air quality models. This work does not explore the effects of future changes in anthropogenic emissions, but isolates the impact of altered climate on ozone and health. The cities' ozone levels are estimated to increase under predicted future climatic conditions, with the largest increases in cities with present-day high pollution. On average across the 50 cities, the summertime daily 1-h maximum increased 4.8 ppb, with the largest increase at 9.6 ppb. The average number of days/summer exceeding the 8-h regulatory standard increased 68%. Elevated ozone levels correspond to approximately a 0.11% to 0.27% increase in daily total mortality. While actual future ozone concentrations depend on climate and other influences such as changes in emissions of anthropogenic precursors, the results presented here indicate that with other factors constant, climate change could detrimentally affect air quality and thereby harm human health.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Temperature

Air Pollution: Ozone

Temperature: Fluctuations

Geographic Feature:

Climate Change and Human Health Literature Portal



resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

United States

Health Co-Benefit/Co-Harm (Adaption/Mitigation):

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact:

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Health Outcome Unspecified, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular disease mortality

Respiratory Effect: Asthma, Chronic Obstructive Pulmonary Disease, Other Respiratory Effect

Respiratory Condition (other) : respiratory disease mortality

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Mitigation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Medium-Term (10-50 years)